

THE CHEMIST

January, 1957

VOLUME XXXIV



NUMBER 1



—Koehn

Dr. Lloyd A. Hall, F.A.I.C.

Receives Honor Scroll of Chicago AIC Chapter

(See Page 7)

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The CHEMIST

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Publication of

THE AMERICAN INSTITUTE OF CHEMISTS, INC.

60 East 42nd street, New York 17, N. Y.

Entered as second class matter April 8, 1916 at the Post Office at New York, N. Y., under Act of August 24, 1912. Issued monthly.

Subscription price, \$2.00 a year to Members, \$3.00 to Non-Members. Single copy, this issue, \$0.25. Copyright, 1957 by THE AMERICAN INSTITUTE OF CHEMISTS, INC.

Volume XXXIV

January, 1957

Number 1

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SCHEDULED FOR EARLY PUBLICATION

Sixteen Years of Chemical Education in China, Dr. Peter P. T. Sah

Should Consulting Engineers Advertise? (Reprint), Richard L. Moore, F.A.I.C.

Literature Research as a Tool for Creative Thinking, Allen Kent, F.A.I.C., and J. W. Perry, F.A.I.C.

Award of Honorary Membership to Dr. W. George Parks, F.A.I.C.

An Educator Aids the Quest for Knowledge, Lawrence H. Flett, F.A.I.C.

The Chemist, the Industry and National Defense, Simon Askin.

The Relationship of Scientific Manpower to the Future Economic Prosperity and Security of the Nation, D. H. Dawson.

Award of Pennsylvania Chapter Honor Scroll to Dr. Charles L. Thomas, F.A.I.C.

"The Committee recommends that . . . any company having the opportunity to establish or revise their professional title structure try to incorporate the more popular titles shown in this survey." (See page 25.)

IN THIS ISSUE

Special AIC Announcements	4
Editorial:	
New Year's Greetings! John H. Nair, F.A.I.C.	5
Will You Come	6
Investments in Tomorrow, Dr. Lloyd A. Hall, F.A.I.C.	7
Lloyd A. Hall—The Citizen, Henry J. Richardson, Jr.	15
Lloyd A. Hall—The Scientist, Dr. George L. Clark, F.A.I.C.	18
Presentation to Lloyd A. Hall	21
Summary Report on Chemical Profession Title Survey for the Chicago Area	25
Communications:	
The Professional Status Dilemma	35
Contributors Wanted	35
The News About Dr. Fisher	35
Council	36
AIC Activities	36
New Jersey Chapter	36
New York Chapter	37
Washington Chapter	37
Opportunities	38
Something New	38
Condensates	Inside Back Cover

TO COME IN FEBRUARY

Dr. W. George Parks, Hon. AIC, will inform us about the Gordon Research Conferences and their importance to the profession. He recently received Honorary AIC Membership at a meeting of the New England AIC Chapter. • In "Literature Research as a Tool for Creative Thinking," Allen Kent, F.A.I.C., and J. W. Perry, F.A.I.C., will reveal how the library can be a tool for creative work, in much the same manner as the laboratory.

We Recommend for Your Needs

Baker & Adamson	Molnar Laboratories	23
Division	Phoenix Chemical Labs	24
Bios Laboratories, Inc.	Robinette Research Labs	6
Food Research Laboratories	Foster D. Snell, Inc.	38
O. Johnson & E. Scudder	R. Steckler Labs	37
The Lento Press	Truesdail Laboratories	40
U. S. Stoneware	Outside Back Cover	

SPECIAL AIC ANNOUNCEMENTS

Gold Medal Award

Dr. Roy C. Newton, Hon. AIC, vice president of Swift and Company, Chicago, Ill., has been unanimously selected to receive the 1957 Gold Medal of The American Institute of Chemists. Dr. Lincoln T. Work, chairman of the AIC Committee on Medal Award, stated that the medal is being given in recognition of Dr. Newton's tireless service to the profession and his leadership in food technology. The medal will be presented at the Annual Meeting of the INSTITUTE, to be held at the Sheraton-Mayflower Hotel, Akron, Ohio, May 22-24, 1957.

"Equal Tax Rights For the Self-Employed"

In a report by this title on the editorial page of the October, 1956 issue of THE CHEMIST, Benjamin Sweedler, F.A.I.C., chairman of a Committee appointed by the National AIC Council to study the Jenkins-Keogh Bill, stated that a similar Bill to permit the self-employed to set aside retirement funds, tax free, until benefits are received, would be introduced into Congress this year. Since then, this matter has also been referred to the chairmen of the AIC Chapters, who have been asked to form Committees to make recommendations to the Chapters' members and to take such action as they may decide.

Employment Contracts

Copies of the proposed employment contract form, prepared by the Subcommittee of the AIC Committee on Employer-Employee Relations, have been sent by the AIC Secretary to placement officers in colleges and universities accredited in chemistry and chemical engineering. Acknowledgments indicate that the contract form is of interest. Perhaps the following comment from one of the placement counselors is representative of its usefulness: "Material of this nature is always helpful to students as they have little in their formal education which deals with this and similar aspects of their future employment." (The contract form was published in the March, 1955 issue of THE CHEMIST. Mimeographed copies are available at 15 cents each.)

First Meeting of New Chapter

The newly-formed Twin City Chapter of the AIC will hold its first meeting on February 15th, when AIC President Nair will present the group with a Charter and will officially welcome the new Chapter. The Chapter was formed by approval by the National Council of a petition presented by Fellows of the AIC in the Minneapolis-St. Paul area. The Chapter area has been designated as the state of Minnesota.

EDITORIAL

New Year's Greetings!

John H. Nair, F.A.I.C.

President, The American Institute of Chemists, Inc.

AT no time in the history of chemical research and development in America has there been so strong and unsatisfied a demand for the services of chemists and chemical engineers as this year of 1957. For this reason we have become suddenly very newsworthy. If we are alert and active professionally for the next several years the lay public will become increasingly aware of our technical contributions. This should stimulate markedly the recognition of us as professionals, who are due a preferred status in the community.

Your membership in the INSTITUTE assures me that you are willing to work toward the attainment of such recognition, which is the primary objective of the INSTITUTE. Each of us, if we try, can find some way to serve in our local community in a capacity which will be helped by the particular knowledge and training we possess. It may be as a member of the school board, a planning commission, a public health committee or similar bodies. We might be examiner for the merit badge in chemistry for the local Boy Scout Council. Any of us could volunteer to work on a Community Chest drive. Thus, we can show our fellow citizens that we are as normal as any of them and that we

have professional skills worthy of recognition.

If you are a member of a local Chapter you can help it set up some task which will further the attainment of local appreciation of chemists and chemical engineers as professionals. No chairman or secretary can accomplish much without strong support from alert, interested, working members. Let each one be vocal with suggestions in 1957. Let each member resolve to attend Chapter meetings. Let none refuse when called on to help. Most important, enlist the interest of your associates in joining the INSTITUTE and working with you to advance its program.

Finally, put aside May 23 and 24 to participate in the annual meeting of the INSTITUTE in Akron, Ohio. May each of you help the INSTITUTE to great success in 1957!

New Society: The American Association of Bioanalysts, representing the amalgamation of the Council of American Bioanalysts and the National Association of Clinical Laboratories, Thomas S. Hosty, director, Division of Laboratories, Alabama State Department of Public Health, heads the new Association. Otto Lobstein, F.A.I.C., of Beverly Hills, Calif., is national scientific director.

Will You Come

Feb. 8, 1957. New York Chapter. Joint meeting with the New York Section of the American Chemical Society. Speaker: Dr. Clifford Rassweiler, F.A.I.C., "The Duty of the Chemist to the Community." For information: Miss June Larsen, Sugar Research Foundation, 52 Wall St., New York 5, N.Y.

Feb. 13, 1957. National AIC Council and Board of Directors. Dinner meeting. The Chemists' Club, 52 East 41st St., New York 17, N.Y.

Feb. 26, 1957. New Jersey Chapter. Plant visit to RCA Laboratories, Princeton, N.J. 2:00 p.m. Business meeting, 5:00 p.m. in lounge of Nassau Club of Princeton. Dinner 6:30 p.m. Registration required for RCA plant tour which is limited to fifty persons. For reservations: Dr. F. A. Lowenheim, Program Chairman, P.O. Box 471, Rahway, N.J. (FULTON 1-3000).

March 11, 1957. New York Chapter. Presentation of Honorary AIC Membership to Lawrence H. Flett, formerly AIC president. Details to be announced.

April or May (Date to be announced). New Jersey Chapter. Speaker Dr. Detlev W. Bronk, president Rockefeller Institute and National Academy of Sciences. For information, James Abel, Picatinny Arsenal, Dover, N.J.

April 4, 1957. New York Chapter. Young Chemists' Meeting. Program to be announced.

May 1957. (Date to be announced) New Jersey Chapter. Military Park Hotel, Newark, N. J. Cocktails 6 p.m., dinner 7:00 p.m. Annual awards, program and speaker. Student medals will be presented to outstanding students of chemistry in the New Jersey Chapter area.

May 21, 1957. National AIC Council and Board of Directors. Dinner Meeting. Sheraton-Mayflower Hotel, Akron, Ohio.

May 22-24, 1957. Thirty-fourth Annual Meeting. THE AMERICAN INSTITUTE OF CHEMISTS. Sheraton-Mayflower Hotel, Akron, Ohio.

June 6, 1957. New York Chapter. Honor Scroll Award meeting. Program to be announced.

April 10-11, 1958. Thirty-fifth Annual Meeting. THE AMERICAN INSTITUTE OF CHEMISTS. Los Angeles, California. Host: The Western AIC Chapter.

May 14-15, 1959. Thirty-sixth Annual Meeting. THE AMERICAN INSTITUTE OF CHEMISTS, New York, N. Y. Host: The New York and New Jersey Chapters.

For Record: Meetings in January

Jan. 10, 1957. Pennsylvania Chapter. Penn Sherwood Hotel, Philadelphia, Pa. Reception, 6:30 p.m. Dinner, 7:30 p.m. Annual Honor Scroll Award dinner. Dr. Charles L. Thomas, F.A.I.C., outstanding chemical engineer, honored for his outstanding contributions to the profession of chemistry.

Jan. 10, 1957. Chicago Chapter. Chicago Engineers Club, Chicago, Ill. Dinner. Speaker: Dr. O. K. Neville, director of the Chemistry Department, Nuclear — Chicago. Subject "Atomic Energy and the Chemist."

Jan. 15, 1957. New Jersey Chapter. Meeting at Montclair State Teachers College, Montclair, N.J. Subject, Education. Speaker: Dr. W. O. Baker, vice president, research, Bell Laboratories.

Jan. 15, 1957. Washington Chapter. Luncheon. O'Donnell's Sea Grill, Washington, D.C. Speaker: Dr. Charles R. Naeser, professor of chemistry, George Washington University. Subject: The Education of Chemists.

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Investments in Tomorrow

Dr. Lloyd A. Hall, F.A.I.C.

Technical Director, The Griffith Laboratories, Inc., Chicago 9, Illinois

(Acceptance address when the author received the Honor Scroll Award of the Chicago AIC Chapter, at a testimonial banquet, Oct. 5, 1956, Chicago, Ill.)

THE narrative of the rise and fall of political despots and warriors is the story of social and economic unrest. It was on this stage of restless human activity that the era of scientific discovery dawned scarcely more than four centuries ago. But mankind, more intent on incantation than on investigation, treated the early scientist with cold suspicion and oftentimes persecution. Even today such treatment has not completely disappeared.

The marshalling of the forces from the bowels of the earth, coal and water, into steam power brought on the first great revolution. In the second, the forces from out of the heavens, nitrogen and oxygen, were made to yield a new power. Today we are in the midst of the third world revolution, the splitting of atoms and their harnessing into inconceivable products for our ultimate benefit and protection.

During 1933-34, the City of Chicago held an outstanding Exposition. More than 50,000,000 people attended this successful venture, appropriately called the Century of Progress. This splendid civic project lifted Chicago from the doldrums of the depression, sparked other cities in their recovery, aided many business concerns, and helped people to forget

the previous years of disaster and want.

But if we were amazed by this Exposition and the Hall of Science exhibits, what must we think in 1956, merely twenty-two years later, of the results of progress made through scientific developments! The more you reflect on our modern improvements, the more you are astounded at the distance we have come in one-hundred years or so! The end is not in sight.

We are again standing on the threshold of a new era; jet planes, color television, cinerama, new plastics, atomic power, new products, and new industries, new methods of doing business. How will these changes affect us?

The progress of science through chemistry, engineering, medicine and agriculture have placed vast power in the hands of mankind. The research leading to the development of the atomic bomb focussed unusual attention on the scientist. Some now blame him for this tremendous and catastrophic achievement, not realizing the effects this will ultimately have in the creation of an increasingly prosperous and more satisfactory environment. The public does not sufficiently understand that all of us—everything we use, wear, eat,

our transportation, communication, homes, health—are directly influenced by chemistry. The whole nation's welfare demands, indeed, that our people be enlightened in the matter of the relation of chemistry to our national life. Two examples vividly illustrate the relationship. This year the entire chemical world has paid tribute to two unusual men of science, one an inventive genius, William Henry Perkin; the other, a humanitarian as well as a chemist, Harvey W. Wiley.

William Henry Perkin, quite by accident, just 100-years ago, was responsible for creating the first synthetic dye, mauve, in an attempt to synthesize quinine. This new dye had the power to dye silk and wool. Perkin had the foresight to patent his process and establish the first factory for the manufacture of dyes. His discovery was in the nature of a catalyst that motivated the start of a new, key industry, because of its relation to national security and to a nationally balanced manufacturing system. This industry has given employment to thousands; has stimulated interest in the adoption of the many phases of science and engineering as a career, and brought innumerable new products that have contributed to "our modern way of life." The centennial of Perkin's discovery was climaxed by a celebration during the week of September 10th in New York City.

Harvey W. Wiley became chief of the Chemical Division of the U.S. Department of Agriculture in 1883. The first problem with which he was confronted was food adulteration. After many years of investigation of abuses in the production of foods and drugs, Dr. Wiley and his supporters were successful in having Congress pass the first National Food and Drug Law, June 30, 1906. Many improvements in this Act have been made, and it is conceivable that further improvements will come when needed. The Food, Drug and Cosmetic industries have been celebrating the 50th anniversary of the Federal Food and Drug enactment this year. However, much of the credit for this Act must be given to Dr. Wiley who was the father of it. His determination in fostering and fighting for this legislation, more than half a century ago, has materially aided in the improvement of health.

But the public generally is not aware of the two examples I have cited, nor of many other scientific accomplishments of human and industrial importance for useful and happier living. Scientists themselves, as well as industry, have been largely responsible for an inefficient, indifferent communication and public relations program. Industry is now aware of this and the public relations departments, supported by science editors of newspapers and mag-

INVESTMENTS IN TOMORROW

azines, are doing an increasingly better job of publishing scientific news for the lay public.

Also scientific societies are recognizing the importance of supplying qualified science speakers to forums, clubs, PTA's, churches and other lay groups to tell them in understandable terms the benefits they derive from our endeavors. This provides a method for developing understanding, improved public relations and increased respect for what scientists contribute to human happiness. Nor should we, as scientists, be neglectful of our civic duties and social activity as good citizens. Too few of us have been interested in civic affairs and have avoided them as the duty of more social minded citizens. Indirectly, this attitude has not helped the understanding nor the appreciation of the public for us. Our active interest in this area can be greatly improved and accelerated.

Economic Status

In appraising the advancement of chemists and chemical engineers during the past forty years, it is interesting to note the change in economic status and job opportunities.

From 1916, when job opportunities were few and salaries low, there was little change in the scientists' welfare, because of the depression, until the middle '30's. Then research was resumed on a much larger scale than expected, with a boom in chemical industry. By 1940, a shortage of chemists and engineers was beginning

with a corresponding increase in salaries and status. With World War II, these shortages became of real concern and industry grabbed every chemist, engineer and other scientifically trained person. Since then, with the continued technological advancement of industry, more businesses are recognizing the advantages that scientists bring to them. The tempo of the times demands change in production methods. New products require scientific research. So these shortages have become more acute and disturbing, particularly in view of the unstable world affairs, and the fact that we must always be ready to protect ourselves.

Before World War I, industrial research was considered to be a highly speculative venture. This opinion changed greatly between the two World Wars. Applied research and development are a major part of industrial operations. The gross national product has had an average growth rate of about 3% per year since 1910, while research and development had an average growth rate of about 10% per year. In 1920, the annual expenditure for research and development was about \$50,000,000, but the terrific growth rate for the past 35 years shows we are now spending almost \$5-billion, per year, or as much as we spent cumulatively from 1776 through 1933. Of the cumulative total of more than \$40,000,000,000 spent through 1954, the half-way point

was reached in 1948. Expenditures for research and development were almost exactly 1% of the gross national product in 1953, while capital expenditures were approximately 11%. This is a spectacular growth and undoubtedly the trend will continue, though possibly at a slightly reduced rate.

A study of eleven industries from 1947 to 1954 shows the top three spent 5.7% of sales on research and development and had a 52% gain in profits; the middle three spent 0.9% on research and had a 9% gain in profits; the last three spent 0.2% on research and saw profits shrink 3%. Apparently this is statistical confirmation that innovations aimed at increasing profits are the mainspring of capitalistic development. One executive has said, "The next ten years will produce the highest level of prosperity the American people ever dreamed of." It appears that this statement is not overly optimistic.

The Problem of Scientists For the Future

Statistics show that there will be a tremendous population increase in our country. From the present 165,000,000, the population increase in the next 25 years at the same rate will find almost 200,000,000 people living in this country. If industry desires to keep pace with population increase, it must do more than expand its physical properties. This means we have a real problem to solve concerning the shortage of scientists

and the construction of a national philosophy to fit the scientific needs of the nation, social as well as technical.

There has been considerable action recently concerning these shortages. Government, industry and scientific organizations have been active in alerting themselves and the public on this matter. The Scientific Manpower Commission, The Engineering Manpower Commission, The National Science Foundation, the Manufacturing Chemists Association, The AIC, the American Chemical Society and other organizations have been sensitive to this and the correlating problem of education.

The shortage of scientists and engineers in industrial research can best be summarized by the findings of the National Science Foundation:

1. Half the firms made no point of numerical shortages, but stated that the expansion of research and development programs is being hindered by their inability to find people with the kind and quality of training needed.
2. One sixth of the companies reported moderate shortages in their general engineering and scientific research staffs.
3. One-third are facing acute shortages of major proportions. Significantly, this group included all or most of the aircraft, electrical equipment, petroleum, paper, food and primary metal companies embraced in the survey.

The study was limited to personnel in research and development, hence has no bearing on the additional needs in production, sales, and administration. Therefore, it pro-

INVESTMENTS IN TOMORROW

vides no basis for generalizing on the magnitude of the over-all shortage, but it does focus attention on scarcities in specific disciplines. In engineering they included chemical, electrical (especially electronic), mechanical and aeronautical; in science—chemistry, physics, metallurgy and mathematics, with smaller but no less critical requirements in pharmacology, pathology, microscopy and geophysics.

We are not alone in having a technological shortage. Great Britain reports its industry has only 75% of the scientists required. Russia is way ahead of us in supplying scientists to its industries. Reports are that Russia is graduating 45,000 to 55,000 engineers and scientists per year from its schools and that they have had an equivalent training to that given in American universities. These reports have attached grave significance to Soviet higher educational programs. William Benton in some of his observations on Soviet scientific education states:

"About 90% of all students in these higher institutions are on state scholarships . . . This largely removes from Soviet education the factor of the economic status of the parents, which is so important in the U.S. in determining the educational advantages and advancement of the young people. After a male student has been accepted at a higher educational institution, he applies for draft deferment, which is apparently automatic . . . The Soviet policy, however, is manifestly designed to utilize youth and manpower so that its sum total productivity will bring maxi-

mum benefits to the state. This policy, in my judgment, as it increases in effectiveness, poses a most serious threat to the West, dangerous in war because of its efficiency, and ominous in any form of competitive coexistence we can envisage. The victory in such competition between the U.S.S.R. and the West in areas like Asia and Africa may well go to the largest battalions of technologists trained for export."

It is interesting that at the 1955 convention of the American Chemical Society in Minneapolis, 738 employer representatives had only 240 chemists to work on at the ACS Employment Clearing House. One large industrial organization stated that in 1955 they were successful in meeting only 65% of their needs for scientific and engineering personnel, and in 1956, had recruited only 54%. Others report comparable experiences. These surveys indicate that the number of engineers and scientists now being graduated is only about enough to cover replacement requirements, while the needs of industry, government and education are mounting. These needs are now about twice as great as our current graduating classes and annual production of scientists with Ph.D. degrees.

Some observers believe the big problem is in science education. Thus the Manufacturing Chemists Association has developed a program of coordinating educational services with industrial needs. The indications are that education has not kept pace at any level with the scientific and technical developments of industry. There

are many reasons. Some contend that there is difficulty in getting school age youngsters interested in scientific subjects. There is a shortage of teachers in the scientific fields. The most important objective of the MCA program, however, does not have to do with inspiring qualified students to follow science as a career, but is to provide practical aid for science teaching and opportunity; MCA states, "to aid and encourage science teachers and educational administrators toward the goal of increasing their numbers, their effectiveness and their prestige."

This program indicates that at least three steps must be followed to eliminate these shortages:

1. To make science more appealing and to induce more students to choose science as a career.
2. To increase the supply of science teachers, especially at the high school level and to improve their training and teaching methods in elementary science.
3. To subsidize students who show the proper aptitudes and interest in a science career.
4. To utilize retired scientists and engineers of reasonably good health in teaching both at high school and university levels.

An increasing number of nationwide meetings are held each year to interest students in science. One such cooperative meeting in Chicago, a Career Conference co-sponsored by the *Chicago Sun-Times*, Illinois Institute of Technology, and the Chicago Technical Societies Council, has been successful for seven years with

an annual attendance of 3000-4000. Such Career Conferences are also being held at various colleges and universities. They are particularly valuable when conducted for students at the freshman and sophomore levels, when the students have not yet decided what their life's work should be. I have participated in eight Career Conferences (four at high school level and four at college level) and I have observed the intense interest of the students and have heard their expressions of the immense value of these conferences to them.

Many cities have a shortage of teachers, notably New York city. Dr. Jansen, superintendent of schools, New York, indicated that a survey on June 26, 1956, "showed a current lack of 47 full time science teachers needed to staff 235 science classes in the high schools in September." To alleviate this condition, Dr. Jansen thinks there is merit in the suggestion to recruit retired scientists and engineers for part-time teaching of biology, chemistry, physics, and related technical courses in mathematics. The New York AIC Chapter has been in the forefront on this recommendation regarding older scientists and engineers.

A recent report of a National AIC Committee states that job opportunities grow scarce for the chemist as he becomes older (past 35 or 40) and more experienced, except where he advances to management level. The problem of the utilization of the

INVESTMENTS IN TOMORROW

older chemist is an important one which personnel managers and recruiting officers should reconsider in all fairness, especially in view of the shortages that exist. Each individual must be considered on his own merits and potentialities and not dogmatically labeled with the so-called tendencies of his age group.

A considerable number of companies have been interested in subsidizing students and are active in promoting some phase of this. The Du Pont company is probably the best example of industry's interest. Du Pont states, "The interests of the chemical industry are the interests of the science of chemistry and . . . more opportunities should be given for higher work in this science." For example, Du Pont will give \$270,000 for the 1956-57 school year to universities for unrestricted fundamental research in chemistry. It will contribute more than \$650,000 to support scientific education and help to meet the acute demand for scientists. Part of this aid is to colleges and universities to advance the teaching of chemistry and allied subjects. Another part provides for post-graduate fellowships. The newest facet in the Du Pont educational aid program provides fellowships for training high school science and mathematics teachers.

THE AMERICAN INSTITUTE OF CHEMISTS is one scientific society that has faced up to the problem of increasing the supply and quality

of chemists and chemical engineers through its Student Award Program, in which awards are presented to outstanding college seniors in chemistry and chemical engineering, most of whom continue in college for graduate degrees. The American Chemical Society, other national scientific societies, colleges and universities also grant awards, scholarships and fellowships to outstanding students. Other large chemical companies, and some relatively smaller concerns, are either maintaining or starting scholarship programs. Some have initiated educational programs for potential scientists by offering various plans for their employees' children; a forthright farsighted plan for their own advantage which is also effective in establishing excellent employee relations and good general public relations. The government, through some of its agencies such as National Science Foundation, offers science grants for graduate study and research. The NSF recently announced 289 grants for a total of more than \$3,500,000 to promote basic research, the exchange of scientific information and the training of science teachers. This may induce others to support and promote like projects.

However, industry, as well as government, could greatly implement this program by subsidizing high school students of promise in scientific education. Selfishly, industry could do this for their own individual companies to maintain their own

supply of scientists. Industry can no longer depend upon someone else to supply its manpower and professional personnel. It can produce its own by future planning and positive action.

While many agencies are urgently working to solve this shortage problem, and with some success, since this is of major importance as insurance for the future, it would be sound reasoning to set up some type of cooperative organization.

A Plan Proposed

My suggestion for one type of plan may not be especially new, but I think it workable, and it has not yet been tried. After finding a sponsoring organization to call a meeting, selected invitations would be sent to top level representatives of scientific societies, universities and colleges, school superintendents, industrial concerns, educational foundations, scientific research foundations, government agencies, scientific publications, manpower councils or commissions exclusive of government, and others. The U. S. Government could well be the sponsor.

As a result of such a meeting, a permanent non-profit organization could be formed, detailing contributions, structure, and plans for a cooperative undertaking on a long-term basis for eliminating scientific shortages. By this consolidation of effort on every phase of the problem, much more could be accomplished than by the individual effort of various agencies. Such an idea deserves at least

careful consideration.

The use of professional manpower changes with the progress and development of industry. What was good in the past sometimes is of little value in the future. As living conditions change, living habits and working precedents must be also re-evaluated. We must consider life and all its functions in the new concepts of scientific development. Tradition and status quo become obsolete with domestic and world changes, with the progress and improved living we all enjoy. The respect and dignity of the individual, the increased education and ability of people, offer the industrialist a potential source of scientific personnel of various persons of different ethnic backgrounds, for his more intelligent use. This better use of manpower, vocational or professional, with population increase indicates a continued growth of industry, and a fuller, richer life for all. Scientific developments and scientific thinking, together with the inevitable social change and more liberal attitudes are an integral part of my optimistic belief in maintaining the world peace we all desire.

In a few years we will probably only vaguely remember the comparisons we are now making, with some anxiety, especially to the Soviet scientist output, because our own supply will be adequate to maintain an equilibrium between the supply and demand of scientists which will sustain the growth and development of our

INVESTMENTS IN TOMORROW

industries and the needs of our people.

In this connection, we cannot forget that our increased activity in civic affairs and our public relations with citizen groups in modestly informing them about the part we play in the advance of civilization will elevate our status and remove public suspicion.

True Perspective

All things in life are relative. Whether a thing is good or bad, big or small, attractive or repulsive, depends in part on how it appears in relation to its environment, or saying it another way, it depends on one's perspective. Henry Adams, the noted 19th Century American wrote, "Time and experience alter all perspectives." But while the capacity to view things in their true relationships increases with age, true perspective like truth itself, is an absolute and imperishable thing that exists even when we are unaware of it. True perspective, though befogged, beclouded

and obscured, will eventually shine through the darkness like a beacon showing all the values in their proper positions of relative importance, pointing the way toward peace of mind, tolerance and brotherly love. Scientists should have this type of perspective.

What I have said is common knowledge, but repetition is valuable in inducing active participation. My subject has referred largely to the mutual assistance of people in the development and use of scientists. The success of this project is materializing through our intelligence, integrity, loyalty, kindness, humility and fairness, through the contributions that we are making to the continued growth of industry, to our nation, and to a way of life which is good for people the world over. If we can in large measure live up to these concepts, we may feel justified in the belief that "Investments in Tomorrow" are profitable.

Lloyd A. Hall--The Citizen

Henry J. Richardson, Jr.

Attorney, 4150 North Illinois St., Indianapolis, Indiana

(Excerpts from a talk given when Dr. Hall received the Honor Scroll Award of the Chicago AIC Chapter, Oct. 5, 1956, Chicago, Illinois.)

MY good friend, Dr. Lloyd A. Hall, is one of Chicago's most distinguished citizens and leaders. Indiana is happy to join with Illinois in paying tribute to this outstanding scientist and nationally known Amer-

ican. This occasion is also my opportunity to get in a point on our argument, which has been running for many years, over the issue that the legal profession is nobler and more serviceable to humanity than the

field of science! Lloyd's mental neurons have played tricks on him since high school days when he developed a secret ambition to become a lawyer. He was an honor science student in high school, and a star baseball player, but he could not master the prerequisites for law, so naturally he turned to the field of chemistry where he found no need to worry about the *corpus delicti* as he could create his own in the test tube! Though he has distinguished himself in the field of chemistry and allied sciences, he has availed every opportunity to dabble with legal terms and phrases and surprisingly has picked up some of their meanings. Exhibit A and collateral proof of this was his fine contribution as chairman of the subcommittee of the AIC on contracts in 1953-54. As usual he did an unusually fine job.

One of the Commandments bids us to honor our fathers and mothers and by obedience to our parents in our youth and kindness and consideration for them as age advances, we become the products of their training, and they are honored by our lives of useful service to our fellowmen. Dr. Hall was born in Elgin, Illinois, June 20, 1894, the son of Isabelle and E. Augustus Hall. His paternal grandfather, Abram T. Hall, a freedman, from Pennsylvania, came to Chicago in 1837. His paternal grandmother came to Illinois in 1841, also a free citizen. His father was born in Chicago and his mother in Mendota, Ill.,

so you see he is an Illinois product. In honoring Lloyd Hall, we pay homage to his ancestors and extend salutations to his God-fearing and inspiring mother who lives in Washington, D.C. We also salute his loyal, loving and patient wife, Myrrhene Newsome Hall who was his first real sweetheart, and who for thirty-seven years has been his confidant-adviser, shock absorber, guinea pig, and balance wheel. They are blessed with two fine children and one granddaughter — a son, Kenneth Lloyd Hall, now serving with the U.S. Armed Forces; a daughter, Mrs. Dorothy Ann Powell of New York, N.Y., and Myrrhene Powell, granddaughter.

Dr. Hall's outstanding professional achievements have won for him Fellow association and membership in numerous national scientific, fraternal and civic organizations; these are all personally cherished honors, held in high esteem, but none equals his high respect of membership and the fellowship of his association with THE AMERICAN INSTITUTE OF CHEMISTS and the honor and confidence extended him by this distinguished body in 1954-55, when he served as chairman of the Chicago Chapter.

One of his greatest achievements of citizenship service is his value of harmony, for through harmony there is manifested to him the power and force of new life and new avenues of opportunity and achievement—the natural human and Divine magnetism

LLOYD A. HALL . . .

of cooperation. His achievement of this virtue was not inherent in the strictest sense for it is free to all. It came to him through discipline and necessity—a burning desire and want and a willingness to pay the price of surrender to the motives of good and the virtues of service. Lloyd abides with the Hindu saying, "One never bathes in the same river water twice." So it is that time moves on, and time and progress must be served. Improvement, change, progress, and service are his mottoes. To him, time is a Divine lease from God and progress is man's inspired motivation to justify his Divine lease. His public service is a monument to one who assumes the over-all responsibility of serving his fellowman beyond moral, legal or professional commitment and is justifiable payment and consideration for his Divine, God-given lease on life.

King Solomon wrote in the Book of Proverbs, "He that walketh with wise men shall be wise, but a companion of fools shall be destroyed." Man, the social being, in the company of his fellowmen, is influenced by those with whom he associates, and he exerts an influence upon others, and in the spirit of liberty, he respects the rights of others. So it is with Dr. Hall. His influence has been felt through his service as board member of the Wabash Avenue Y.M.C.A., Chicago Urban League, Kenwood Neighborhood Redevelopment Corp., Lake-Meadows Hospital

Corp., and as member of the City Club of Chicago; the Mayor's Commission on the House of Correction; Executive Committee of the National Association for the Advancement of Colored People; the Chicago Assembly; membership in four Greek letter fraternities and president and vice-president of the Chicago Chapter of Alpha Phi Alpha Fraternity; president of Druids Club and trustee of the First Baptist Church, plus his recent appointment by Mayor Daley as a member of the Hyde Park Conservation Community Council—the first of its kind in the nation—as a conservation and rehabilitation project. These and other outstanding services have merited Dr. Hall's listing in *American Men of Science*, *Who's Who in Chemistry*, *Who's Who in Illinois*, *Who's Who in Chicago*, *Who's Who in the Central States*, and *Who's Who in Colored America*.

This distinguished honoree has often thanked God, who gave him the chance to lift the dignity and worth of all mankind; for through his knowledge of the teachings and the meaning of the life of the greatest Scientist, Citizen, and Servant of all times, who gave His Life for his fellowmen more than two thousand years ago, Lloyd has been able to rise to the pinnacle of American citizenship and the opportunity to achieve this honor—the fellowship and respect of his fellow citizens.

Lloyd A. Hall--the Scientist

Dr. George L. Clark, F.A.I.C.

Research Professor of Analytical Chemistry, University of Illinois, Urbana, Ill.

(Presented when Dr. Hall received the Honor Scroll of the Chicago AIC Chapter, Oct. 5, 1956, Chicago, Ill.)

IN a recent issue of *The Saturday Review of Literature* there appeared one of the most eloquent and provocative editorials I have ever read. It was entitled "Think of a Man." The beginning words, slightly abridged, are these:

"You are asked to think of a man. Think of someone living whose life has enriched your own. Think back for a moment on the name that has given history a forward thrust, a sense of direction, an infusion of important knowledge, an encounter with the beautiful. A name connected to great ideas or causes or deeds or works of science or art. You are asked to do this because an intimate relationship, all at once, has come to exist between the life of such a man and your own. The turn of events has now made you the custodian of all his works."

Think, then, with me of a man, Lloyd A. Hall, and particularly of one facet of his full and useful life, that of the true scientist. Close association and friendship with him for more than a quarter of a century have given me a unique opportunity to evaluate the driving mechanism, the vision and imagination, the dedication to scientific idealism brought to fruition in sound and enduring achievement of this scientist whom we honor precisely for these qualities. It is impossible to dissect the life, motivation and work of this man into separate categories; the scien-

tific, the philosophic, the moral and spiritual, the response to day-by-day contact with people, problems, joys, sorrows, successes and failures. All of these aspects of living blend synergistically into the whole man whom we have come to know, to respect, and hold in affectionate regard, and now to honor.

Let me remind you of the biographical milestones which have contributed to the scientific career of Lloyd Hall. In him there is an excellent heritage from both sides of his family, a heritage of love of freedom, some of it gained on the 'underground railroad' of the Civil War; a heritage of determined effort to live the good life, of appreciation of the advantages of education and the guidance of religion, stemming from a paternal grandfather who founded and was first pastor of a flourishing Chicago church. Lloyd's parents provided a scientific incentive from early boyhood for they saw sixty years ago the challenge of medical and chemical training for their son. In this atmosphere and with a naturally inquisitive mind the boy became deeply interested in science and especially chemistry even before entrance into high school. It is to the eternal credit of the teachers in East High School

of Aurora, Ill., that they recognized and nurtured an innate ability and scientific potentialities. The result was the decision to prepare for a career in chemistry, graduation with honors, and an attendant scholarship at Northwestern University where Lloyd studied chemistry in courses wherever he could find them. From Northwestern he received degrees from the School of Pharmacy and from the College of Liberal Arts and Sciences. Work towards the Ph.D. was begun at the University with a sound combination of biochemistry, organic chemistry and physics under Nobel Laureate Compton. I was also a graduate student at Chicago during part of this time, but by some mischance the acquaintance and friendship of these many years was delayed until a later date. This ambitious program for Lloyd Hall was carried on in the evenings while he held full time jobs in industrial laboratories and ultimately under Civil Service appointment as senior chemist in the Department of Health Laboratories at Chicago, with principal work in the field of foods.

The first World War interrupted this graduate work as it did for so many chemistry students, and Lloyd was called to the Ordnance Training School for Powder and Explosives operated by du Pont in New Jersey, subsequently serving as inspector at ordnance plants and as one of the organizers of the Ordnance Supervisory and Control Laboratory under

the direction and inspired leadership of two of the most eminent professors of organic chemistry in this country: Frankfurter of Minnesota and Gomberg of Michigan. A better intensive course and experience in this field of chemistry could not be imagined, and Lloyd made the most of the opportunity. But the original devotion to the tremendous possibilities of food chemistry as a science, instead of a largely empirical trade or art, remained as a star on the horizon. Inevitably by those chance encounters which determine the course of a lifetime, Lloyd Hall returned to the field to which he has contributed so brilliantly since 1919, first at a packing plant in Ottumwa, Iowa, and then elsewhere, culminating in the establishment in Chicago of a consulting practice in food chemistry.

In this capacity, he demonstrated an uncanny power of predicting the vast potential usefulness of modern instrumental techniques in food research, testing, and specifications. And so he came to us at the University of Illinois, where this instrumentation was available, with these pioneering ideas of utilizing x-rays, electron microscopy, ultraviolet and infrared spectrophotometry, chromatography and the newest methods of analytical chemistry, to solve the complex problem of the production, purification, utilization, improvements and safeguarding of food, an essential factor in the everyday life of every human. For nearly three decades, this

stimulating, rewarding relationship has continued to exist between the members of the Departments of Chemistry and Chemical Engineering, Food Technology, Bacteriology, and others of the University of Illinois, and with Dr. Hall, with incalculable mutual benefits. In recognition of its unreserved respect for the remarkable versatility, demonstrated ability, creative powers, persistence and personality of this man, this chemistry faculty unanimously recommended Dr. Hall's election to the Illinois Chapter of Sigma Xi, the national, honorary, scientific research society, an extraordinary step without precedent since he was not an alumnus, nor in any way officially affiliated with the University. Our faith was rewarded by his initiation address which will remain always in the memory of fellow initiates and faculty members of the Society for its masterly theme of inspiration and hope and its eloquent presentation.

One of the clients of Consultant Hall was a classmate and fellow student, Carroll L. Griffith, now the president of the Griffith Laboratories of Chicago, manufacturers of meat-curing chemicals and many other food products. It was inevitable upon the basis of successful services and creative ideas that Dr. Hall should be called to devote his full time as technical director of the Griffith Laboratories. In this capacity, and with the continued backing of Mr. Griffith,

the recipient of this AIC Honor Scroll has reached this momentous day in his life. The award itself is clear indication of the awareness of the achievements and honors which have come to Dr. Hall—honorary Sc.D. degrees; positions of honor and trust in scientific societies to which he has contributed so much enthusiastic hard work; his numerous scientific papers and patents; the heavy demands upon him as a lecturer, advisor, committee member; all of these far transcending the boundaries of food chemistry. It has been said that the awe-inspiring and sometimes difficult Food and Drug Administration has more sound respect for a fearless food chemist named Hall than for any other colleague who may approach the sanctum. His humanitarian efforts and his inspiring citizenship, inseparable from the truly scientific attributes, have been eloquently portrayed by Mr. Richardson on this program. These are tangible evidences of a full and productive life continuing at unabated pace. Not the least of the guiding factors are the faith and encouragement of a devoted wife and children and happily even grandchildren.

Let us describe the kind of intensely burning flame which illuminates the pathway of Lloyd Hall.

"If our purposes are frail, if the value we attach to the idea of progress is small, if our concern for the next generation is uninspiring, then we can bow low before the difficulty, stay as we are and accept the consequences of drift. But if we have

LLOYD A. HALL . . .

some feeling for the gift of life and the uniqueness of life, if we have confidence in freedom, growth, and the miracles of vital change, then difficulty loses its power to intimidate."

Think of a man who has this feeling and confidence! He would say that it is not enough for man to profess oneness with other men; he must act it out. Not enough to wear the garment of religious identification; he must accept its ethical and moral obligations and glory. Not enough to lay claim to personal sacredness; he must bind himself to it through respect for it and sensitivity to it. Not enough to boast of the gift of a rational intelligence; as a true scientist he must nurture it, work it, apply it, defend it. Not enough to prate about justice; he must create a basis for it in the world itself.

Think of this man of science! Though in the vigor of his life, he may not be conscious of the spirit which guides him, yet he might well echo these words of Dr. Henry Van Dyke to express his innermost thoughts:

Let me but live my life from year to year,
With forward face and unreluctant soul;
Not hurrying to, nor turning from the goal,
Not mourning for the things that disappear
In the dim past; nor holding back in fear
From what the future veils, but with a whole
And happy heart, that pays its toll
To youth and age, and travels on with cheer.
So let the way be up the hill or down,
O'er rough or smooth, the journey will be joy;
Still seeking what I sought when but a boy—
New friendships, high endeavour and a crown;
My heart will keep the courage of the quest,
And hope the road's last turn will be the best.

This is not the last turn, but it surely is a delightfully good one. May there be many other happy turns in the road before the last and best comes in the pathway of Lloyd Hall—scientist, citizen, Christian gentleman, friend.

Presentation to Lloyd A. Hall

DR. Lloyd A. Hall, F.A.I.C., technical director of The Griffith Laboratories, Inc., Chicago 9, Ill., received the Honor Scroll of the Chicago Chapter of THE AMERICAN INSTITUTE OF CHEMISTS on October 5, 1956, at a testimonial dinner in Chicago, Illinois.

Dr. Edmund Field of Standard

Oil Co., (Indiana), Whiting, Indiana, and chairman of the chapter, presided. Henry J. Richardson, Jr., attorney of Indianapolis, Indiana, spoke on "Lloyd A. Hall—the Citizen." Dr. George L. Clark, professor of chemistry, University of Illinois, Urbana, Ill., discussed "Lloyd A. Hall—the Scientist." The presen-



Dr. Hall (right) receives Honor Scroll from AIC President Nair

tation of the Honor Scroll was made by John H. Nair, AIC president. Dr. Hall accepted the award with an address on "Investments in Tomorrow." (These papers appear on preceding pages of this issue of *THE CHEMIST*.)

In his informal acknowledgment of the Honor Scroll, Dr. Hall expressed his appreciation to the officers and members of the AIC, to his many friends, some of whom came to the meeting from long distances, to the speakers, to Dr. Raymond E. Kirk of Polytechnic Institute of Brooklyn,

to his family, and to his employers, Carroll L. Griffith, F. Willard Griffith, and Mervyn C. Phillips of the Griffith Laboratories, where he has worked happily for more than twenty-seven years. He pointed out that "no one individual alone, whoever he may be, succeeds without assistance. Accomplishment accrues largely from fair play and unselfish teamwork. I have had this and able colleagues to advise, assist and collaborate with frequent success on many problems and projects."

The citation on the Honor Scroll reads:

PRESENTATION

To Lloyd A. Hall

Because of his intense interest and influence in promoting truly professional attitudes and constructive actions in the profession of chemistry; his enthusiasm and positive direction in guiding and promoting the professional growth of young chemists; his very active participation and recognized leadership in both civic and technical organizations, and because of his outstanding technological accomplishments in industry.

Honored: David H. Killeffer, F.A.I.C., Tuckahoe, N.Y., by the award of the first James T. Grady Medal, given by the American Chemical Society, for distinguished reporting of chemistry, chemical engineering and related fields. Mr. Killeffer, chemical engineer, and writer, is the author of several books and many magazine articles. His most recent book is *Two Ears of Corn, Two Blades of Grass*. Presentation of the award will be made this Spring.

Appointed: Dr. Milton Harris, F.A.I.C., as director of research of The Gillette Co., to direct and coordinate the research activities of the company and its subsidiaries. He will continue as president of Harris Research Labs., Washington 11, D.C.

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Honored: Dr. Sidney M. Cadwell, F.A.I.C., director of research and development of the United States Rubber Company, New York, N.Y., with the 1956 Charles Goodyear Medal, at a banquet of the Division of Rubber Chemistry of the American Chemical Society, in Atlantic City, N.J., September 20th.

Elected: The following officers for The Chemical Institute of Canada: President, Dr. Clifford B. Purves, F.C.I.C.; Vice-president, Dr. O. J. Walker, F.C.I.C.; Chairman of the Board, E. A. Crockett, M.C.I.C.; Treasurer, R. J. Allen; General Manager and Secretary, Dr. Garnet T. Page, F.C.I.C., 18 Rideau St., Ottawa, Ont., Canada. The 1957 Annual Conference will be held in Vancouver, B.C., June 3-5.

Appointed: Frank J. Steele, M.A.I.C., chief pharmacist at the Greenwich Hospital, Greenwich, Conn., as a member of the faculty of the J. M. Wright Technical School, Stamford Conn.

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Appointed: By Monsanto Chemical Co., St. Louis 4, Missouri, John J. Healy, Jr., F.A.I.C., as director of general development for the Research and Engineering Division. Dr. Hal G. Johnson, F.A.I.C., will receive a six-months leave of absence from Monsanto in January to undertake a government assignment at Washington, D.C.

Honored: T. H. Hopper, F.A.I.C., head of the Analytical, Physical-chemical and Physics Section of the Southern Regional Research Laboratory, New Orleans, La., who received a Superior Service award from the U. S. Department of Agriculture in Washington, D.C., for his contributions to research on the utilization of Southern farm crops. Mr. Hopper is president of the American Oil Chemists' Society.

Installed: Milton A. Glaser, vice president of Midland Industrial Finishes, Waukegan, Ill., as the thirty-fifth president of the Federation of Paint and Varnish Production Clubs.

Meeting: Of the Fourth General Assembly and International Congress of the International Union of Crystallography to be held in Montreal, Canada, July 10-19, 1957. The secretary of the U.S.A. National Committee on Crystallography is Dr. G. A. Jeffrey, The Chemistry Department, The University of Pittsburgh, Pittsburgh 13, Pa.

Announced: By Dr. Johan Bjorksten, F.A.I.C., president of Bjorksten Research Laboratories, Madison, Wis., the adoption of an employee retirement trust plan for all employees who make their careers with the company. The Trust will be supported by annual irrevocable contributions by the Laboratories of one-half of the company profits.

Elected: Dr. Daniel H. Terry, F.A.I.C., as vice president in charge of research and development of The Bon Ami Company. He has been with the company since 1952 as research director.

Abroad: Hillary Robinette, Jr., F.A.I.C., president of Robinette Research Laboratories, Inc., in Ardmore, Pa. On November 23rd, he spoke on "Recent Developments in Textile Wet Processing and Finishing" before the 29th Congress of the Societe de Chimie Industrielle, in Paris. He returned to the U.S. in December.

Summary Report on Chemical Profession Title Survey for the Chicago Area

(A survey conducted by the Economic Status of Chemists Committee of the Chicago Chapter of The American Institute of Chemists, August 1, 1956)

I. Introduction

EACH year a number of national surveys are made by professional organizations, government agencies, and industrial management organizations on professional salaries, titles, working conditions, etc. Although these surveys serve a useful purpose, they suffer from several drawbacks, which make it questionable as to whether their over-all value is worth the time and expense involved. First of all, by their very generalized or statistically-averaged nature covering all segments of the country, they cannot be analyzed by employer or employee in any regional area without application of a "fudge" factor. This is especially true with respect to salary surveys where regional averages may vary as much as 20% above or below the national average. In the absence of a regional survey, reliance must be placed upon developing the "fudge" factor by utilization of regional cost of living indexes. Here, again, we have an averaged factor embracing all professional and non-professional workers, and it is well known that salaries in any particular area for any particular occupation vary more directly with the law of supply and demand than with the

cost of living index for that area.

Another drawback to most of the national salary surveys is the reliance placed upon the relationship between years of experience since graduation versus salary. Although factual data are lacking, it is suspected that titles are more dependent upon the necessity for salary change than the converse. In other words, title changes are made more often to justify salary increases than are salary increases made because of normal promotion to a higher level of responsibility. Certain individuals with special ability and initiative are able to assume a high degree of responsibility within a few years after graduation, and their title and salary with respect to years of experience contribute in a survey to raise the average upward in the low-experience bracket, whereas many individuals reach the limit of their ability within six to ten years after graduation and reach a plateau in salary and title which tends to lower the average in the higher-experience bracket. It does become evident that any survey of salaries should not only take into account years of experience but also the degree or relative position in the

company of the employee's duties and responsibilities.

The 1956 Committee for the Economic Status of Chemists of the Chicago AIC Chapter adopted the philosophy that the economic problems of the chemical employee and his employer are closely related. Previous activities of the Chicago AIC Chapter have been concentrated upon improving the economic and professional status of members of the chemical profession. The Committee decided that this purpose would be furthered by extending similar assistance to the chemical employer in the Chicago area. The following objectives were set forth, therefore, in a long-range program involving possibly two or three years for the Chicago Chapter Committee on Economic Status of Chemists:

1. The Committee was to ascertain whether employers of the chemical profession in the Chicago area needed salary and title survey assistance and, if the answer was in the affirmative, whether they would be willing to cooperate with the Chicago Chapter in providing data necessary for continued surveys on a periodic basis.

2. It was first of all recognized that salary information would have to be obtained in such a way that the actual salary structure of any individual company would not be revealed and the salary survey should be coupled in some way with the degree of responsibility in addition to the years of experience. From the standpoint of taking the simplest thing first, the Committee decided that it would restrict itself initially to a survey of titles and, if the results were favorable, recommend that the following committee in 1957 consider a similar survey with respect to salaries.

II. Scope of the Survey

In the absence of any definite knowledge as to whether the chemical industry in the Chicago area was interested in having a title survey made, it was decided that better cooperation would be obtained if the survey questionnaire were kept as simple and short as possible. The original objective of relating duties and responsibilities with titles proved to be incompatible with a one-page simple questionnaire. As a result, the title survey presented in this report relates titles only with respect to years of experience plus a degree and does not take into account the influence of ability to assume and delegate responsibilities. Each company was invited to send in additional data if available with respect to duties and responsibilities for each position, but these qualifications were not a formal part of the questionnaire. The results of the survey, therefore, are not as practical as they should be, and it may be said that the results are most important in pointing out the direction which a subsequent salary survey should take.

Each company in the Chicago area employing chemists or chemical engineers as shown in the A.C.S. and AIC Chicago directories was sent a one-page title questionnaire shown in Fig. 1. This was accompanied by a transmittal letter pointing out the purpose of the survey and asking for cooperation of the company in pro-

Fig. 1

A.I.C. TITLE QUALIFICATION SURVEY - 1956

(For professional chemical personnel only; do not include routine factory or sales workers).

1. Approximately how many professional (college degree or equivalent) chemical personnel do you employ? _____
2. List the titles for *non-supervisory* chemical personnel your company uses together with corresponding years of experience beyond a degree which are approximate requirements for appointment to the position or are an average result of other qualifications you may require.

USE THIS SPACE

EXAMPLE

- a. Research Assistant, 0-1
- b. Assistant Chemist, 1-4
- c. Research Chemist, 4-8
- d. Senior Chemist, 8+

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____
- h. _____
- i. _____

3. List titles for *supervisory* personnel in order of increasing rank or degree of responsibility and approximate number of personnel under the supervision of each.

EXAMPLE

- a. Project Leader, 0-4
- b. Group Leader, 3-7
- c. Assistant Supervisor, 4-10
- d. Supervisor, 6-20
- e. Assistant Director-Staff Position
- f. Director, 50-200

USE THIS SPACE

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____
- f. _____
- g. _____

4. Do you credit chemical experience in lieu of a degree? _____
5. If answer to 4 is yes, how many years of experience are usually required to be considered equivalent to a B.S.? _____ M.S.? _____ Ph.D.? _____
6. Do you use a formalized method of appraisal on performance of chemical personnel?

7. If answer to 6 is yes, what type of appraisal?

8. List on back of this sheet any special qualifications of education or experience you consider pertinent to appointment to positions itemized in 3 and 4.

viding the data requested. In return for cooperation, the company was promised a copy of the results of the survey. In order to make sure that all information was maintained on a strictly confidential basis, a separate self-addressed envelope for return of the questionnaire was provided, and therefore, the questionnaire could not be identified with any particular company.

The questionnaire was sent to 124 companies in the Chicago area. The chairman of the Committee had been informed by a professional survey group that a return of 15% may be considered good for mail questionnaires of this type. A total of 58 companies or 46% replied to the questionnaire, indicating that there is a high degree of interest in professional title structure among the companies surveyed. In fact, several companies in addition to returning the questionnaire sent letters elaborating in greater detail their interest in the survey and in a few cases complimented the Chicago Chapter on the undertaking. Fourteen of the companies replying to the questionnaire employed people with engineering or chemical education only in what may be considered nonprofessional activities, such as sales representatives, service representatives, etc.; therefore, these companies were not included in the survey. The remaining 44 companies included in the survey represented a total staff of 1,951 professional chemical employees. Four

questionnaires were not completed and furnished only partial information.

It is obvious that a high degree of interest and appreciation of the survey exists, and if this fact had been known in the beginning, it would have been preferable to prepare a more comprehensive questionnaire than the one shown in Fig. 1.

III. Survey Results and Analysis

For purposes of preliminary analysis, the returned questionnaires were divided into four groups representing companies employing various size staffs. Table I lists the number of companies in each group and also summarizes the results of questions 4 and 6 of the questionnaire. The table shows, as might be expected, that as a general rule the companies with the largest staffs utilize more titles than those with smaller staffs. The need for formal appraisal methods would also increase as a company grows larger. The need for setting up a formalized method of crediting chemical experience (question 4) in lieu of a degree might also be expected to increase with companies requiring larger numbers of employees in the professional bracket. With two exceptions, however, such credit for degree was restricted to the equivalent of a B.S. degree.

The 40 companies included in this survey (four questionnaires being in-

TABLE I
(44 Companies Reporting)

	0-10	10-50	50-150	Over 150
	Staff Group 15	Staff Group 19	Staff Group 5	Staff Group 5
Total number of companies in group				
Number of companies with no nonsupervisory titles	0	1 (5%)	0	1 (20%)
Number of companies with 1 nonsupervisory title	4 (27%)	2 (10%)	0	0
Number of companies with 2 nonsupervisory titles	4 (27%)	4 (21%)	1 (20%)	1 (20%)
Number of companies with 3 nonsupervisory titles	6 (40%)	2 (10%)	1 (20%)	0
Number of companies with 4 nonsupervisory titles	1 (7%)	7 (37%)	2 (40%)	0
Number of companies with 5 nonsupervisory titles	0	3 (16%)	0	0
Number of companies with over 5 nonsupervisory titles	0	0	1 (20%)	3 (60%)
Number of companies with 1 supervisory title	5 (33%)	2 (10%)	0	0
Number of companies with 2 supervisory titles	7 (47%)	3 (16%)	0	1 (20%)
Number of companies with 3 supervisory titles	2 (13%)	5 (26%)	2 (40%)	0
Number of companies with 4 supervisory titles	1 (7%)	3 (16%)	2 (40%)	0
Number of companies with 5 supervisory titles	0	5 (26%)	1 (20%)	2 (20%)
Number of companies with over 5 supervisory titles	0	1 (5%)		2 (40%)
Number of companies crediting experience for B.S.	4 (27%)	10 (53%)	3 (60%)	2 (40%)
Number of companies occasionally crediting experience for B.S.	0	2 (13%)	2 (10%)	1 (20%)
Number of companies using appraisal methods	2 (13%)	5 (26%)	1 (20%)	3 (60%)

complete did not allow their use in all phases) are utilizing 33 titles for the nonsupervisory category covering an experience range of 0 to 20 years after the B.S. degree. Seven of these titles were either for staff positions or of such a specialized nature that they could not be incorporated in the survey. Other titles were found having a common generic base and, being obviously of equivalent rank, were combined under one simplified title. For example, laboratory assistants, research assistants, technical assistants, etc., were all combined under one term of assistant. The resultant 25 titles selected for the survey are shown in Table II. Percentages are only approximate but 3% is equivalent to one company. The most popular titles in order of their use versus years of experience plus a degree are: Assistant, assistant chemist (or engineer), junior chemist, chemist, research chemist, senior chemist. These titles plus associate chemist are plotted in Fig. 2 to illustrate the per cent usage versus the experience range covered. It can be seen that there is considerable overlapping, but the general trend is the employment of descriptive terms such as assistant, junior, and associate, for professional workers with less than four years of experience plus a degree. The majority of the companies restrict the title of chemist to employees with greater than two years of experience, and an even greater percentage use

the prefix "research" before the title of chemist to denote an even higher range of experience. The most popular title for the very experienced professional worker is that of senior chemist or engineer. The larger companies employing a large professional staff have evidently found a need for further expansion of the title structure and use additional titles, such as research associate, senior research chemist, senior scientist, etc., to provide additional title scope for their staff.

Excluding staff positions, a total of 31 supervisory titles was reported by 42 companies in the survey. Very similar titles were again generalized into one title creating a total of 23 supervisory titles which are listed in Table III. The most popular supervisory titles in increasing order of number of staff reporting to the title are: Project leader, group leader, chief chemist, supervisor, assistant director, director, and manager. Column A was obtained by listing the maximum number of personnel reporting to the title as reported by any company. The titles are arranged in order according to Column A, but the results can be misleading. For example, many companies with a very small scientific staff use the titles of assistant chief chemist and chief chemist, but the number of staff reporting to the titles in the arrangement in Column A does not show the true degree of responsibility which

TABLE II — TITLE USAGE VS. YEARS EXPERIENCE
(40 Companies Reporting)

TITLE	Yr. (%)	Yr. (%)	Yr. (%)	Yr. (%)	Yr. (%)	Yr. (%)	Yr. (%)	Yr. (%)	Total %
Assistant	0-1 (12)	0-2 (12)							24
Assistant Chemist	0-1 (6)	0-2 (3)							32
Laboratory Technician	0-1 (3)								3
Trainee		0-2 (3)							3
Assistant Project Chemist									
Junior Chemist	0-1 (12)	0-2 (6)	0-3 (3)	0-4 (3)	1-4 (3)	1-5 (3)	2-5 (3)	3-5-5+ (3)	6
Chemist Intermediate									30
Chemist 3 or C									6
Chemist 2 or B									6
Associate Chemist									6
Chemist	0-2 (3)	1-5 (9)	1-6 (3)	2-4 (6)	2-5 (3)	3-7 (3)	5-8 (3)	2+ (6)	12
Chemist									39
Chemist 1 or A	4-7 (3)	8+ (3)							6
Research Chemist	0-12 (6)	1-5 (3)	1-9 (3)	1-10 (3)	2+ (6)	2-5 (9)	3-10 (3)	4-8 (3)	
Research Chemist	4+ (3)	4-10 (6)	6-10 (6)	7+ (3)	7-9 (3)				57
Chief Chemist	7+ (3)								3
Project Leader	4+ (3)	5+ (3)							6
Project Chemist	1-4 (3)	5-7 (3)	6+ (3)	5-15 (3)					12
Senior Project Chemist	5+ (3)	7-10 (3)	10+ (3)						9
Senior Chemist	4+ (6)	4-6 (3)	5+ (9)	5-10 (9)	7+ (3)	8+ (6)	8-11 (3)	9+ (6)	
Senior Chemist	3-7 (3)								48
Scientist	11-14 (3)								3
Evaluation Chemist	10-15 (3)								3
Senior Research Chemist	5-20 (3)	10+ (3)							6
Senior Scientist	10+ (3)	14-17 (3)							6
Research Associate	10+ (6)	15+ (3)	17+ (3)						12
Senior Research Associate	17+ (3)								3
Senior Scientific Advisor	17+ (3)								3

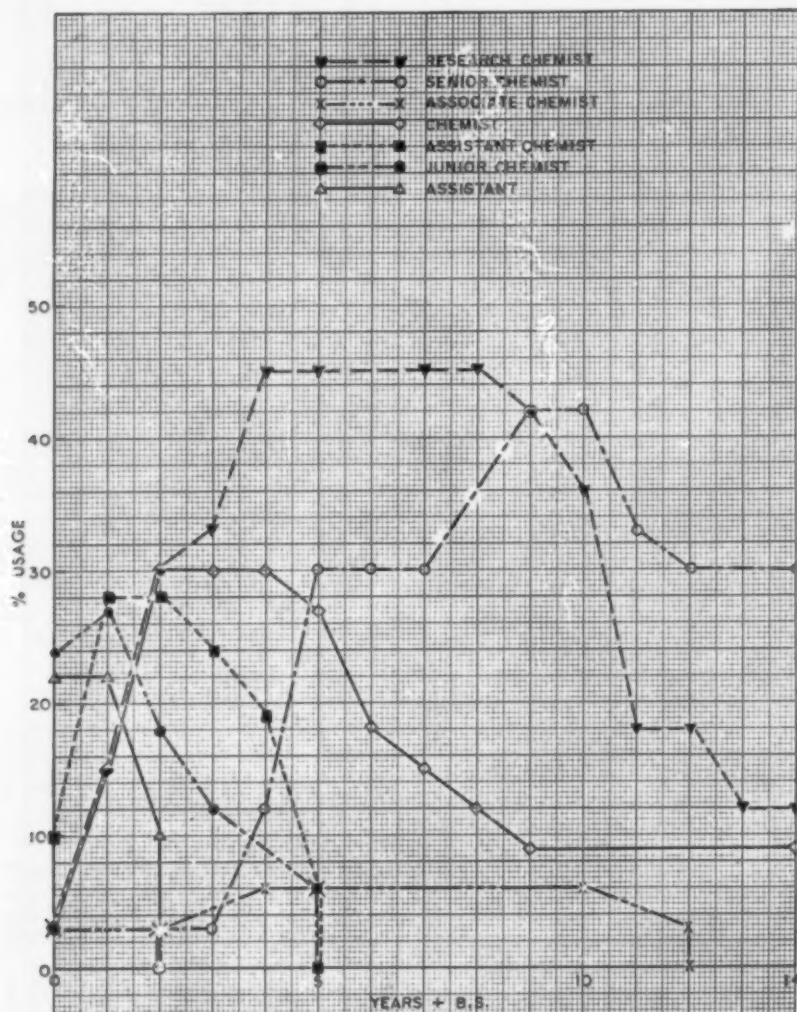


FIG 2 - MOST POPULAR TITLES BY RANGE COVERED.

TABLE III

LIST OF SUPERVISORY TITLES USED IN APPROXIMATE ORDER
OF INCREASING DEGREE OF RESPONSIBILITY

(42 Companies Reporting)

Title	A	B	C
	Maxium Number of Personnel Reporting To Title	Average Per Cent Responsibility	Per Cent Number of Companies Using
Project Engineer	3	20.	2.5
Project Leader	5	12.	20.
Assistant Chief Chemist	5	50.	5.
Senior Chemist	8	22.	10.
Section Chief	8	15.	2.5
Division Chief	8	10.	2.5
Research Coordinator	10	12.	2.5
Group Leader	15	14.	35.
Assistant Supervisor	15	25.	10.
Section Leader or Head	20	15.	10.
Chief Chemist or Engineer	25	65.	20.
Division Head	25	75.	5.
Supervisor	40	40.	35.
Principal Chemist or Engineer	40	50.	5.0
Deputy Director	40	40.	2.5
Assistant Director	50	65.	20.
Assistant Manager	75	42.	10.
Division Director	100	23.	10.
Director	250	100.	40.
Associate Director	250	100.	5.
Manager	300	80.	25.
Division Manager	500	100.	2.5
Vice Pres. in Charge of Research	over 500	100.	10.

actually exists in the company for the titles. The Committee thought, therefore, that a better way to represent the relative degree of responsibility for each title was to calculate what is termed the average per cent responsibility shown in Column B of Table III. The average per cent responsibility is obtained by dividing the number of staff reporting to each title by the total professional staff of each company. This gives the ratio of responsibility for each title with relation to total staff of any one particular company. The summation of these ratios for all the companies using the same title is then divided by the number of companies using the title to calculate the average per cent responsibility. On this basis, the most popular supervisory titles in increasing order of average per cent responsibility are: Project leader, group leader, supervisor, chief chemist, assistant director, manager, and director.

IV. Conclusion

It is obvious from the results of this survey that there is very little standardization in the use of titles in the Chicago area for the chemical profession. It would appear to be of benefit to not only chemists and chemical engineers but also to their employers if some standardization with respect to the use of titles, both supervisory and nonsupervisory, could be attempted in the next few years. The biggest problem lies not so much

with the actual titles themselves but rather with the overlapping wide range of experience which each title covers. The Committee recommends that in the future any company having the opportunity to establish or revise their professional title structure try to incorporate the more popular titles shown in this survey and also attempt to obtain more uniformity in the range of experience specified for each position chosen, for example, by using the experience ranges which this survey shows are most frequently associated with each title. The Committee also recommends to the next Economic Status of Chemists Committee that, if they decide to continue this work by making a salary survey, they attempt to incorporate some means of relating salary to degree of responsibility in addition to the usual method of utilizing years of experience.

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Communications

The Professional Status Dilemma

To the Editor:

I greatly enjoyed reading in the October, 1956, *CHEMIST*, Mr. W. E. Austin's letter entitled, "How to Improve Professional Status." Our society has been in the forefront in improving the status of all members now for many years; I think our past president, Dr. Gustav Egloff, was one of the first to warn us of this status dilemma.

Let me be very emphatic in calling it a dilemma—and national at that. All professional people and hiring personnel managers, and all presidents and other officials of American free enterprise will agree to this word, "dilemma," after a thorough reading of the recently released report of the National Industrial Conference Board.

Greater numbers of professional people are entering the ranks of, or are forming, unions of their own each month—now about 60,000 out of our total of 500,000 total engineers in this country. Their reasons for forming unions and joining up are about the same as those of the worker in the auto, coal, oil, or other industry.

This report must be studied at once. Austin's suggestion No. 2 in his letter calling for certification of the chemist is the only solution. I think also the French and Canadian Institutes of Chemistry had from the very beginning very severe entrance requirements. I think this is needed by our own Institute. There is also no use comparing our chemical societies to the American Medical Association, since the latter is an iron-clad, tough, "hard to get into," tightly-knit organization of high standing. So high that no one disputes their word—their word, their prescriptions or their invoice.

I wish to hear from those in charge of the Institute's Committee on Certification what is now being done in this matter. Apparently (other societies) have accomplished very little in this direction. We are "at the brink", and it is very late.

—Edwin J. Barth, F.A.I.C.
Northampton, Mass.

Contributors Wanted

To the Editor:

M. J. Kamlet of the Chemistry Division, Naval Ordnance Laboratory, and I of the Los Alamos Scientific Laboratory, are preparing for publication a collection of all ultraviolet spectrophotometric data in sixty journals for the period 1946-1956. We are currently looking for additional contributors who might help in this project.

—Dr. Herbert E. Ungnade, F.A.I.C.
614 47th St., Los Alamos,
New Mexico

The News About Dr. Fisher

To the Editor (and others):

Cluttering your desk with jingles galore
Same old greetings as before
Merry Christmas—and how are you?
Hope you had a good year too.

Eventful here—with retirement Number 4
But back to the Lab by another door
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To get the minerals from the sea.

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By January first in this new field
We're off to see what this will yield.

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We'll keep in touch and let you know
Our new address before we go.

—Dr. Harry L. Fisher, Hon. AIC
Los Angeles, Calif.

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Visit to RCA Laboratories

The New Jersey Chapter will visit the RCA Laboratories at Princeton, N.J., Tuesday, February 26, 1957. During this

visit and tour, beginning at 2:00 p.m., AIC members will learn through discussion and demonstration some of the developments and contributions made at the RCA David Sarnoff Research Center.

Following the tour, the annual business meeting of the Chapter will begin at 5:00 p.m. Conducted by Dr. Max Bender, Chapter chairman, it will be held in the lounge of the Nassau Club of Princeton. Dinner will be served at 6:30 p.m. at \$3.50 per person, including gratuities.

All AIC members and guests are invited to attend both the annual business meeting and dinner. The RCA plant tour

AIC ACTIVITIES

is limited to fifty persons. For reservations, please contact Dr. F. A. Lowenheim, Program Chairman, P.O. Box 471, Rahway, N.J. (Fulton 1-3000).

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"Public Relations and Professional Status"

Dr. Clifford F. Rassweiler, F.A.I.C., vice-chairman of the board, Johns-Manville Corp., and president-elect of the American Chemical Society, will address a joint meeting of the New York AIC Chapter and the New York Section, American Chemical Society, on "Public Relations and Professional Status," on February 8, 1957, at 7:30 p.m. The meeting, to be held at the Union Carbide and Carbon Corporation Cafeteria, 30 E. 42nd St., New York, N.Y., will be preceded by dinner at 5:30 p.m. Price \$2.75. (Members of the New York ACS Section of the New York AIC Chapter are entitled to a 25-cent rebate.)

Dr. Rassweiler will discuss the role public relations can play in improving the professional status of chemists and other scientists. He will elaborate on the reasons why the professional status of chemists is not as high as it could be in spite of the increasing importance of chemistry in the economy. He will also discuss the attitudes that the chemists themselves have about public relations, and will present positive suggestions.

Dr. Rassweiler's application of scientific principles to practical industrial problems has played an important part in his rise to prominence in the field of corporate management. In 1941, he came to Johns-Manville as director of research and development after seventeen years with the du Pont research organization. He was

elected vice chairman of the board of Johns-Manville in February, 1951, in addition to his responsibilities as vice president for research and development, a post to which he was appointed in 1942.

Dr. Rassweiler was graduated from the University of Denver in 1920 with the A.B. degree in chemistry and went to the University of Illinois to teach and do graduate research work under Dr. Roger Adams, Hon. A.I.C. At the University of Illinois, Dr. Rassweiler was awarded the master's degree in 1922 and the Ph.D. in 1924. In June, 1947, the University of Denver conferred the Honorary D.Sc. upon him for outstanding work in the field of industrial research.

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Watson Davis Speaks

The Washington Chapter met at luncheon, on December 11th, to hear Dr. Watson Davis, director of Science Service, Washington, D.C., speak on the objectives of his organization in stimulating interest in science among youngsters, especially those of high school age, and in increasing their general awareness and responsiveness to science teaching.

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Engineers: Wanted at the U.S. Naval Station and U.S. Naval Repair Facility, San Diego, California. GS-9 to GS-12. For information, write the U.S. Naval Station, San Diego 36, Calif.

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"Abstracts of Technical Papers from the Government Synthetic Rubber Program." PB 111736 \$5.00. Off. of Tech. Services, U.S. Dept. of Commerce, Washington 25, D.C.

"Sheftene C2, Food Grade Casein." Scientific study report by Fred C. Ward, to ACS Minneapolis meeting. Reprint available from Sheffield Chemical Co., Inc., subsidiary of National Dairy Research Labs., Norwich, N.Y.


"Smoley's Tables Handbooks." Manuals for civil and structural engineers. 6 Vols. May be purchased separately. For information: C. K. Smoley & Sons, Inc., 30 School Lane, Scarsdale, N.Y.

"Vocational & Professional Monographs." \$1.00 each. For information, Bellman Publishing Co., Cambridge 38, Mass.

Symposium: On Spectroscopy, to be held at the Hotel LaSalle, Chicago, Ill., April 29-May 1, 1957, by the American Association of Spectrographers. For information, Theodore H. Zink, H. Cohn & Sons, 4528 W. Division St., Chicago 51, Ill.

Transferred: To the Sales Department of the Inorganic Chemicals Division of Monsanto Chemical Company, St. Louis 4, Missouri, Dr. Peter G. Arvan, F.A.I.C. He was formerly assistant director of research for the division.

Promoted: Dr. William R. Sullivan, F.A.I.C., by Hoffmann-La Roche, Inc., Nutley, N.J., to the position of general secretary of research. He was formerly assistant to the director of chemical research, and he has been with the company since 1942.

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Received: By Rudolph Seiden, F.A.I.C., the D.Sc. degree from the Technical University of Vienna, Austria, while he was abroad this summer. He had prepared the thesis some years before, but the degree could not be awarded until he appeared in person to take the oral examinations.

Promoted: David W. Young, F.A.I.C., to research associate of Sinclair Research Laboratories, Inc., Harvey, Ill. He joined Sinclair last year after more than twenty years of research in petroleum products and processes. He holds 150 patents in the field.

Elected: To the Board of Directors of the new trade organization, the Vat Dye Institute, Inc., were AIC Fellows, Dr. E. M. May of Otto B. May, Inc., and J. R. Bonnar of General Dyestuff Co. The organization was formed to promote the increased use of color fast vat dyes through a consumer and trade information program.

New Officers: Of the Association of Consulting Chemists and Chemical Engineers, Inc., 50 E. 41st St., New York 17, N.Y.: President, Carl Busow, F.A.I.C.; Vice-president, Dr. Foster Dee Snell, F.A.I.C.; Secretary, Earl D. Stewart; Treasurer, William C. Bowden; Councilors: Nicholas M. Molnar, F.A.I.C., Donald Price, F.A.I.C., Maurice S. Sage, Cecil M. Shilstone, F.A.I.C., and Emerson Venable, F.A.I.C.

Moved: Arthur H. Thomas Company to Southwest corner of Third and Vine Street, Philadelphia, Pa., where increased space and facilities are available to handle its expanding business in laboratory apparatus and reagents.

Re-elected: Dr. John A. King, F.A.I.C., of Warner-Chilcott Research Labs., Morris Plains, N.J., as treasurer of the Division of Medicinal Chemistry of the American Chemical Society.

Honored: Dr. Louis P. Hammett, F.A.I.C., executive officer, Chemistry Department, Columbia University, who will receive the 1957 William H. Nichols Medal of the New York Section of the American Chemical Society. Presentation will be made on March 15, 1957, Dr. E. J. Durham, F.A.I.C., chairman of the jury of award, announced.

Retired: Dr. Charles S. Fazel, F.A.I.C., vice president, Nitrogen Division of Allied Chemical & Dye Corp., after thirty years with the company. His address is 332 So. Sycamore St., Petersburg, Virginia.

Appointed: Dr. John Charles Moessinger, F.A.I.C., as foreign representative of General Aniline & Film Corporation. He joined the firm in 1920 as chemist in the Process Development at the Rensselaer, N.Y., plant. He will reside in Western Europe.

Fellowships: Applications for 1957-58 National Science Foundation graduate and regular postdoctoral fellowships may be obtained from the Fellowship Office, National Academy of Sciences-National Research Council, 2101 Constitution Ave., N.W., Washington 25, D.C. Applications for the Senior Postdoctoral Program may be obtained from the Division of Scientific Personnel and Education, National Science Foundation.

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In a review of the existing knowledge of artificial rainmaking possibilities, by the Commission for Aerology of the World Meteorological Organization, the authors point out that "a net increase of precipitation has not been demonstrated beyond reasonable doubt in any seeding operations yet described in the scientific literature and in other publications, and that at least most of the claims made in newspapers have not had adequate foundation."

Chlorofluorocarbons, according to the Battelle Institute, have exceptional qualities as lubricants, particularly in heavy duty service. Unlike many other lubricants, they are stable in the presence of oxygen.

And generally let every student of nature take this as a rule—that whatever his mind seizes and dwells upon with peculiar satisfaction is to be held in suspicion, and that so much the more care is to be taken in dealing with such questions to keep the understanding even and clear.

—Francis Bacon

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I hope that my children, if not myself, will see the day when ignorance of the primary laws and facts of science will be looked upon as a defect only second to ignorance of the primary laws of religion and morality.

—Charles Kingsley



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